

S P E C I F I C A T I O N P R O P O S A L

Vehicle Configuration

FREIGHTLINER M2 106 CONVENTIONAL CHASSIS
2015 MODEL YEAR SPECIFIED
SET BACK AXLE - TRUCK

General Service

FIRE/EMERGENCY SERVICE
EMERGENCY VEHICLES BUSINESS SEGMENT
MEDIUM TRUCK WARRANTY
EXPECTED FRONT AXLE LOAD: 14600 lbs
EXPECTED REAR DRIVE AXLE LOAD: 30000 lbs
EXPECTED GROSS VEHICLE CAPACITY: 44600 lbs

Engine

CUM ISL 350 HP @ 2000 RPM, 2200 GOV RPM, 1000
LB/FT @ 1400 RPM

Engine Equipment

2013 ONBOARD DIAGNOSTICS/2010 EPA/CARB/GHG14
NFPA COMPLIANT EMBER SCREEN AND FIRE
RETARDANT DONALDSON AIR CLEANER
DR 12V 275 AMP 40-SI QUADRAMOUNT PAD
ALTERNATOR WITH REMOTE BATTERY VOLTAGE
SENSE
(2) ALLIANCE MODEL 1231, GROUP 31, 12 VOLT
MAINTENANCE FREE 2250 CCA THREADED STUD
BATTERIES WITH JUMPSTART POST
BATTERY BOX FRAME MOUNTED
WIRE GROUND RETURN FOR BATTERY CABLES WITH
ADDITIONAL FRAME GROUND RETURN
POSITIVE LOAD DISCONNECT WITH CAB MOUNTED
CONTROL SWITCH MOUNTED OUTBOARD DRIVER
SEAT
CUMMINS 18.7 CFM AIR COMPRESSOR WITH
INTERNAL SAFETY VALVE
CUMMINS EXHAUST BRAKE INTEGRAL WITH VARIABLE
GEOMETRY TURBO
RH MTD HORIZONTAL AFTERTREATMENT SYSTEM
HORTON DRIVEMASTER ON/OFF FAN DRIVE
AUTOMATIC FAN CONTROL WITHOUT DASH SWITCH
1100 SQUARE INCH ALUMINUM RADIATOR WITH
SENDURE HEAT EXCHANGER
ANTIFREEZE TO -34F, ETHYLENE GLYCOL PRE-
CHARGED SCA HEAVY DUTY COOLANT
GATES BLUE STRIPE COOLANT HOSES OR
EQUIVALENT
CONSTANT TENSION HOSE CLAMPS FOR COOLANT
HOSES
ELECTRIC GRID AIR INTAKE WARMER
DELCO 12V 38MT HD STARTER WITH INTEGRATED
MAGNETIC SWITCH

Transmission

ALLISON 3000 EVS 5 SPD AUTOMATIC TRANSMISSION
WITH PTO PROVISION

Transmission Equipment

TRANSMISSION PROGNOSTICS - ENABLED
MAGNETIC PLUGS, ENGINE DRAIN, TRANSMISSION
DRAIN, AXLE(S) FILL AND DRAIN
PUSH BUTTON ELECTRONIC SHIFT CONTROL, DASH
MOUNTED
WATER TO OIL TRANSMISSION COOLER
TRANSMISSION OIL CHECK AND FILL WITH
ELECTRONIC OIL LEVEL CHECK
SYNTHETIC TRANSMISSION FLUID (TES-295
COMPLIANT)

Front Axle and Equipment

DETROIT DA-F-14.7-3 14,700# FF1 71.5 KPI/3.74 DROP
SINGLE FRONT AXLE
MERITOR 16.5X5 Q+ CAST SPIDER CAM FRONT
BRAKES, DOUBLE ANCHOR, FABRICATED SHOES
FIRE AND EMERGENCY SEVERE SERVICE, NON-
ASBESTOS FRONT LINING
HALDEX AUTOMATIC FRONT SLACK ADJUSTERS
TRW TAS-85 POWER STEERING

Front Suspension

14,600# TAPERLEAF FRONT SUSPENSION
GRAPHITE BRONZE BUSHINGS WITH SEALS - FRONT
SUSPENSION
FRONT SHOCK ABSORBERS

Rear Axle and Equipment

30,000 LB FIRE/EMERGENCY SERVICE SINGLE REAR
AXLE
IRON REAR AXLE CARRIER WITH STANDARD AXLE
HOUSING
MXL 17T MERITOR EXTENDED LUBE MAIN DRIVELINE
WITH HALF ROUND YOKES
MERITOR 16.5X7 "P" CAM REAR BRAKES, DOUBLE
ANCHOR, CAST SHOES
FIRE AND EMERGENCY SEVERE SERVICE NON-
ASBESTOS REAR BRAKE LINING
HALDEX AUTOMATIC REAR SLACK ADJUSTERS

Rear Suspension

30,000# FLAT LEAF SPRING REAR SUSPENSION WITH
RADIUS ROD FOR FIRE/EMERGENCY SERVICE
SPRING SUSPENSION - 1.50" AXLE SPACER
CUSTOM AXLE CLAMPING GROUP
FORE/AFT CONTROL RODS

Brake System

AIR BRAKE PACKAGE
WABCO 4S/4M ABS WITH TRACTION CONTROL
NFPA COMPLIANT ENHANCED STABILITY CONTROLS
BW AD-9 BRAKE LINE AIR DRYER WITH HEATER

CUSTOM STEEL AIR BRAKE RESERVOIRS
STANDARD AIR SYSTEM PRESSURE PROTECTION
SYSTEM
BW DV-2 AUTO DRAIN VALVE WITH HEATER - WET
TANK

Electrical Connections

UPGRADED CHASSIS MULTIPLEXING UNIT
UPGRADED BULKHEAD MULTIPLEXING UNIT

Wheelbase & Frame

(176 INCH) WHEELBASE / (110 INCH) CA
11/32X3-1/2X10-15/16 INCH STEEL FRAME 120KSI
(63 INCH) REAR FRAME OVERHANG

Chassis Equipment

THREE-PIECE 14 INCH CHROME STEEL BUMPER WITH
COLLAPSIBLE ENDS AND LH WING CUTOUT FOR
SPEAKER
FRONT TOW HOOKS - FRAME MOUNTED
GRADE 8 THREADED HEX HEADED FRAME
FASTENERS

Fuel Tanks

50 GALLON POLISHED ALUMINUM FUEL TANK
ALLIANCE FUEL FILTER/WATER SEPARATOR
6 GALLON DIESEL EXHAUST FLUID TANK

Tires

MICHELIN XZE 12R22.5 16 PLY RADIAL FRONT TIRES
MICHELIN XZY-3 315/80R22.5 20 PLY RADIAL REAR
TIRES

Hubs

CONMET PRE-SET BEARING IRON FRONT HUBS
WEBB IRON REAR HUBS

Wheels

22.5X8.25 10-HUB PILOT 5.72 INSET POLISHED
ALUMINUM DISC FRONT WHEELS
22.5X9.00 10-HUB PILOT 10-HAND POLISHED
ALUMINUM DISC REAR OUTER WHEELS

Cab Exterior

106 INCH BBC FLAT ROOF ALUMINUM CONVENTIONAL
CAB
AIR CAB MOUNTS
NFPA COMPLIANT EXTERIOR GRAB HANDLES
HOOD MOUNTED CHROMED PLASTIC GRILLE
CHROMED HOOD MOUNTED AIR INTAKE GRILLE
DUAL ELECTRIC HORNS
DUAL 25 INCH ROUND STUTTER TONE HOOD
MOUNTED AIR HORNS
DOOR LOCKS AND IGNITION SWITCH KEYED THE
SAME
INTEGRAL HEADLIGHT/MARKER ASSEMBLY WITH
CHROME BEZEL

LED AERODYNAMIC MARKER LIGHTS
DAYTIME RUNNING LIGHTS
DUAL 102" WEST COAST BRIGHT FINISH HEATED
MIRRORS WITH LH AND RH REMOTE
LH AND RH 8" BRIGHT FINISH CONVEX MIRRORS
MOUNTED UNDER PRIMARY MIRRORS
63X14 INCH TINTED REAR WINDOW
TINTED DOOR GLASS LH AND RH WITH TINTED NON-
OPERATING WING WINDOWS
TINTED WINDSHIELD
2 GALLON WINDSHIELD WASHER RESERVOIR
WITHOUT FLUID LEVEL INDICATOR, FRAME MOUNTED

Cab Interior

OPAL GRAY VINYL INTERIOR
MOLDED PLASTIC DOOR PANELS WITH ALUMINUM
KICKPLATE LOWER DOORS
GRAY VINYL MATS WITH PREMIUM INSULATION
FORWARD ROOF MOUNTED CONSOLE WITH UPPER
STORAGE COMPARTMENTS WITHOUT NETTING
IN DASH STORAGE BIN
AM/FM/WB RADIO WITH BLUETOOTH/MICROPHONE,
USB PORT, FRONT AND REAR AUX INPUTS AND J1939
(2) CUP HOLDERS LH AND RH DASH
HEATER, DEFROSTER AND AIR CONDITIONER
MAIN HVAC CONTROLS WITH RECIRCULATION
SWITCH
SOLID-STATE CIRCUIT PROTECTION AND FUSES
12V NEGATIVE GROUND ELECTRICAL SYSTEM
DOME LIGHT WITH 3-WAY SWITCH ACTIVATED BY LH
AND RH DOORS
CAB DOOR LATCHES WITH MANUAL DOOR LOCKS
(1) 12 VOLT POWER SUPPLY IN DASH
HIGH BACK AIR SUSPENSION DRIVER SEAT NFPA
COMPLIANT
HIGH BACK NON SUSPENSION PASSENGER SEAT
WITH UNDERSEAT STORAGE NFPA COMPLIANT
LH AND RH INTEGRAL DOOR PANEL ARMRESTS
BLACK CORDURA PLUS CLOTH SEAT COVERS
3 POINT HIGH VISIBILITY ORANGE RETRACTOR
DRIVER AND RH FRONT PASSENGER SEAT BELTS
WITH NFPA COMPLIANT VDR & SEAT BELT SENSOR
ADJUSTABLE TILT AND TELESCOPING STEERING
COLUMN
4-SPOKE 18 INCH STEERING WHEEL
DRIVER AND PASSENGER INTERIOR SUN VISORS

Instruments & Controls

WOODGRAIN INSTRUMENT PANEL
BLACK GAUGE BEZELS
LOW AIR PRESSURE LIGHT AND BUZZER
2 INCH PRIMARY AND SECONDARY AIR PRESSURE
GAUGES

ENGINE COMPARTMENT MOUNTED AIR RESTRICTION INDICATOR WITH GRADUATIONS, WITH WARNING LIGHT IN DASH

ELECTRONIC CRUISE CONTROL WITH SWITCHES IN LH SWITCH PANEL

IGNITION SWITCH WITH NON REMOVABLE KEY

ODOMETER/TRIP/HOUR/DIAGNOSTIC/VOLTAGE DISPLAY: 1X7 CHARACTER, 26 WARNING LAMPS, DATA LINKED, ICU3

FIRE AND EMERGENCY SERVICE VEHICLES ENGINE WARNING

2 INCH ELECTRIC FUEL GAUGE

ELECTRICAL ENGINE COOLANT TEMPERATURE GAUGE

2 INCH TRANSMISSION OIL TEMPERATURE GAUGE

ENGINE AND TRIP HOUR METERS INTEGRAL WITHIN DRIVER DISPLAY

ELECTRIC ENGINE OIL PRESSURE GAUGE

ELECTRONIC MPH SPEEDOMETER WITH SECONDARY KPH SCALE

ELECTRONIC 3000 RPM TACHOMETER

DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY

SINGLE ELECTRIC WINDSHIELD WIPER MOTOR WITH DELAY

MARKER LIGHT SWITCH INTEGRAL WITH HEADLIGHT SWITCH

ONE VALVE PARK BRAKE SYSTEM WITH DASH VALVE

SELF CANCELING TURN SIGNAL SWITCH WITH DIMMER, WASHER/WIPER AND HAZARD IN HANDLE

INTEGRAL ELECTRONIC TURN SIGNAL FLASHER WITH HAZARD LAMPS OVERRIDING STOP LAMPS

Design

PAINT: ONE SOLID COLOR

Color

CAB COLOR A: RED ELITE
 BLACK, HIGH SOLIDS POLYURETHANE CHASSIS PAINT

TOTAL VEHICLE SUMMARY

Weight Summary

	Weight Front	Weight Rear	Total Weight
Factory Weight ⁺	7120 LBS	4620 LBS	11740 LBS

(+) Weights shown are estimates only.

WARRANTY

U.S. Tanker - Fire Apparatus, LLC, Delavan, Wisconsin warrants the new fire apparatus to be free from manufacturing defects in material and workmanship.

100% Parts and labor coverage for a period of thirty (30) years on the stainless steel frame and body assembly against full perforation as a result of rust or corrosion and failure of structural integrity due to manufacturing defects in material and workmanship.

100% Parts and labor coverage for a period of ten (10) years on the stainless steel plumbing against full perforation as a result of rust or corrosion and failure of structural integrity due to manufacturing defects in material and workmanship.

100% Parts and labor coverage for a period of seven (7) years on the exterior paint and finish against blistering, peeling or bubbling arising from manufacturing defects in material or poor workmanship.

100% Parts and labor coverage for a period of one (1) year on any item not mentioned above.

U.S. Tanker - Fire Apparatus, LLC, obligation under this warranty is strictly limited to the repair or replacement, at the discretion of the company, of those components which upon examination by us, prove to be defective and not a result of misuse. Authorization from the company is necessary prior to any warranty work being started. All components must be returned to our factory, freight prepaid, within their specific warranty period.

The warranty is only valid if the apparatus is still owned by the original owner and is being used for the original anticipated end use and has not been repaired or altered outside the company's factory.

The warranty does not cover;

Normal maintenance services, adjustments or consumables which are required either in the operations or maintenance of the apparatus.

Any loss of time or use of the apparatus, inconvenience, loss or damage, whether direct or indirect, incidental, consequential or otherwise arising out of an alleged defect or failure of a component.

Any component parts or trade accessories, such as chassis, engine, tires, pumps, tanks, valves, signaling devices, batteries, radios, electric lights, bulbs, alternators, and all other installed equipment and accessories which are warranted separately by their respective manufacturers.

Any failures as a result of the introduction into or onto the apparatus of chemicals or exposure to excessive heat which may adversely react with the material and cause pitting, corrosion, blistering, peeling or bubbling.

This warranty is in lieu of all warranties, expressed or implied, or all other representations made to the purchaser, and all other obligations or liabilities, including liability for incidental or consequential damages on the part of U.S. Tanker - Fire Apparatus, LLC. This warranty contains the entire warranty. It is the sole warranty and all agreements or representations, whether oral or written, are either merged herein or expressly canceled. We neither assume nor authorize any person supposing to act on our behalf, to modify, extend or waive any provision of this Warranty, to assume any liability on our behalf other than as set forth in this Warranty, or to make any representation or warranty concerning the merchantability of our products.

U.S. Tanker - Fire Apparatus, LLC.

Department: _____

By: _____

Serial #: _____

Title: _____

Date: _____

WARRANTY

APR Plastic Fabricating, Inc., hereinafter referred to as **Seller**, warrants that these goods manufactured and sold by **Seller** will be free from defects in material and workmanship for a period of time equal to the service life of the original vehicle in which they were installed (**one year maximum outside North America**). For this warranty to have full effect, the vehicle must be in active service (for its designed purpose) at the time any defect is discovered.

This warranty is transferable (subject to the approval of the **Seller**) within North America by written notification of **Seller** within thirty (30) days of vehicle transfer date.

Seller's obligation under this warranty is solely limited to repairing or replacing, at **Seller's** option, F.O.B. manufacturing plant, any part of the goods found to be defective within the warranty period. Reasonable costs to remove and reinstall defective product incurred by vehicle manufacturer, or its specific assigns, will be payable by **Seller**. **Costs for travel outside North America will not be covered under this warranty.**

This warranty is conditioned upon receipt by **Seller** of prompt notice of the claimed defect, including a description of the defect and of its discovery, substantiating photographs, and an opportunity made for **Seller** (or its assigned agents) to inspect the goods in the buyer's or end user's facility. Notification must be made in writing or by calling Toll Free 1-800-352-8265. **Seller** will dispatch a repair technician within **48** hours of notification in the event the vehicle has been rendered out-of-service (**Response time only valid in North America**). **Seller** will send a repair technician to arrive at a mutually satisfactory time if the vehicle is still in service. Product must be identifiable by serial number for this warranty to be effective.

This warranty does not apply to goods damaged by misuse, neglect, accident, or physical damage to goods that have been improperly applied. This warranty does not apply to the costs of installation, reinstallation, normal operation, or normal maintenance of any warranted goods.

Installation or modification (subsequent to initial sale) performed by **Seller** will be covered under separate warranty.

Any alteration of warranted goods by persons other than **Seller**, or its specific assigns, will void warranty.

Seller makes no additional warranties, either express or implied, as to any of the goods sold and in particular Seller makes no other warranties of merchantability or fitness for any particular purpose.

In no event shall **Seller** be liable for failure of the goods to comply with any federal, state or local laws or for incidental or consequential damages including loss of profits, or any other type of damage which may be caused in whole or in part by any failure, defect or other problem of the goods sold by seller.

WATER TANK

The tank shall have a minimum capacity of 2000 U.S. gallons and be covered by a Lifetime warranty from the tank manufacturer. The tank shall be of a specified configuration, and so designed to be completely independent of the compartment and/or fender modules. When placed on the chassis the tank should meet or exceed all federal DOT regulations regarding weight distribution, axle loading and horizontal and vertical center of gravity locations.

TANK CONSTRUCTION

The tank shall be constructed using a virgin, stress-relieved, high-impact copolymer polypropylene with a thickness of 3/4" for the outside walls and base and minimum 1/2" for the remainder.

All joints and seems shall be welded and tested for maximum strength and integrity. All swash partitions shall interlock and be welded to each other as well as to the walls of the tank. This forms a "containment" style baffling system that meets the current NFPA 1901 and provides the most effective form of water surge control for improved safety.

The tank shall incorporate a manual fill tower with a 6" combination vent/overflow pipe. The fill tower shall be constructed of polypropylene and shall be large enough to provide filling by means of a conventional 2-1/2" hose nozzle. The tower shall be located near the front of the tank, streetside. The tower shall have a removable polypropylene screen and a polypropylene hinged type cover.

The 6" diameter vent/overflow pipe shall run through the tank, from the fill tower and exit through the floor of the tank behind the rear axle. This location will not interfere with water flow during dump operations and will minimize traction loss of the rear wheels.

The tank covers shall be constructed of high-impact copolymer polypropylene with a minimum thickness of 1/2". The tank cover shall incorporate a minimum of two (2) lifting lugs, for use with the tank empty only, consisting of 2" copolymer dowels. The dowels shall be drills and tapped to accommodate lifting eyes with a minimum security factor of 3 to 1. The lifting dowels shall be welded to the internal partitions and extend through the covers to assist in minimizing cover flex during normal operations.

There shall be one (1) sump included with the tank which shall incorporate an anti-swirl device. The sump shall be constructed of high-impact copolymer polypropylene and be located in the front quarter of the tank (unless otherwise specified by the purchaser under Special Provisions).

Tank connections will be provided to meet the purchaser's specifications. The tank clean-out/drain shall be a minimum 3" N.P.T. coupling in the sump floor; and the tank fill line(s) shall be as specified later in this document. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank. All auxiliary outlets and inlets must meet the current NFPA recommended guidelines in effect at the time of manufacture.

The tank shall incorporate mounting blocks welded into the floor. These blocks shall be engineered and positioned to restrain the tank in the subframe.

The tank shall be mounted to the truck chassis utilizing the structural tubular stainless steel body framework. Captive mounting brackets adequately sized for the tank shall be provided to attach the tank to the framework utilizing a cushioned isolator for positive and negative vertical retention. The sub frame will be separated from the chassis frame by a 1" x 3" solid sill cushion of 60 D (durometer) hardness rubber isolator, and attached to the chassis frame using a minimum of six (6) tie downs. The two front and rear tie downs will be "springer" assemblies and the center tie downs shall be firm (no exceptions). All tie down bolts shall be a minimum, 5/8" grade 8 bolts.

ADDITIONAL 6" VENT/OVERFLOW

An additional 6" diameter vent/overflow pipe shall be provided and shall run through the tank, from the fill tower and exit through the floor of the tank behind the rear axle. This location will not interfere with water flow during dump operations and will minimize traction loss of the rear wheels. The additional vent/overflow system enhances tank fill and dump times for optimum operational functionality.

TANK CONSTRUCTION AND MOUNTING

The water tank shall be custom built to meet the needs of the fire department. It shall be elliptical in design to benefit from the superior strength and safety of that shape. The material of construction shall be ultra high impact polypropylene copolymer using welded construction.

The use of any other type of tank or material will not be acceptable (no exceptions).

The tank shall be self-supporting and constructed by welding together a series of modules to build the complete tank. Each module shall consist of 3/4" or 1/2" dividers and a 3/8" thick shell together with one

longitudinal and one transverse partition to create the baffling system.

To improve the safety of the vehicle by reducing undesired water movement while traveling, the tank will be constructed with a containment baffling system that exceeds current NFPA 1901 recommendations. The containment type baffling system shall include primary transverse partitions and end walls that shall extend down to the bottom of the support sills. Additional partitions shall be placed in an efficient design to minimize water motion and turbulence while traveling. Holes shall be cut to allow both air and water to pass through the baffles to facilitate dumping of the water (no exceptions).

Channel shaped longitudinal sill supports shall be fabricated from 3/4" polypropylene copolymer and full extrusion welded to the underside of the barrel as well as the primary transverse partitions and the end walls. Drain holes will be provided at the end of each section.

A fill tower shall be positioned approximately in the center of the tank and have an open area of no less than 480 square inches and shall be 5" above the top of the shell. The fill tower lid shall be hinged on the curbside and shall open towards the streetside of the tank. The lid shall be retained using a pull latch and sealed with a bulb type EPDM gasket. A tether shall be provided to hold the lid in an open position.

An internal overflow and venting system consisting of a 6" diameter polypropylene copolymer pipe shall be provided and fitted into the fill tower. The combination vent/overflow is permanently open to the atmosphere allowing automatic free entry and escape of air while filling or dumping. The overflow shall discharge behind the rear axle per N.F.P.A #1901. The automatic venting feature of this assembly means that the water load can be dumped quickly without any mechanical or manual operation of the vent.

A sump shall be provided on the underside of the tank with a 3" NPTF clean out port and a NPTF tank to pump suction connection. An anti-swirl plate will be provided internally to exclude cavitation during rapid suction. Note: if midship pump then the tank to pump suction connection will be located at the front head of the tank.

A discharge sump shall be provided at the rear of the tank and positioned below the bottom of the shell to allow complete evacuation during dumping. This sump shall be fabricated from 3/4" polypropylene copolymer and accommodate the installation of dump valves.

The tank shall be mounted to the truck chassis utilizing the structural tubular stainless steel body framework. Captive mounting brackets adequately sized for the tank shall be provided to attach the tank to the framework utilizing a cushioned isolator for positive and negative vertical retention. The sub frame will be separated from the chassis frame by a 1" x 3" solid sill cushion of 60 D (durometer) hardness rubber isolator, and attached to the chassis frame using a minimum of six (6) tie downs. The two front and rear tie downs will be "springer" assemblies and the center tie downs shall be firm (no exceptions). All tie down bolts shall be a minimum, 5/8" grade 8 bolts.

REAR DUMP SYSTEM

One (1) #1065-34 manually operated stainless steel 10" Newton quick dump will be provided at the rear center of the water tank.

90 DEGREE - LEFT/RIGHT REAR DUMP SWIVEL

One (1) Newton #6012SW-34, 10" stainless steel 90 degree swivel shall be supplied to allow the unit to dump left, right, or rear using one (1) 10" dump valve assembly. The adapter shall be equipped with a #4036-34 telescoping slide extension to insure water is dumped away from the vehicle.

REAR FILL (2-1/2")

One (1) stainless steel fill line shall be installed at the rear of the apparatus. It will be located on the curbside of the rear dump assembly. It shall be equipped with a 2-1/2" Fireman's Friend valve with a 1/4-turn drain valve.

A 2-1/2" NSTF swivel 30 degree adapter with plug and chain shall be provided.

APPARATUS BODY AND CONSTRUCTION

The entire body is designed to be independent of the chassis frame and water tank so it can be removed at some later date if required. A body sub-framework will be built and tied down to the chassis frame. The body sections will be welded to the framework forming a single integrated unit that is engineered to withstand the demands of the Fire Service.

The body side panels and catwalks will be 14 gauge stainless steel attached to the subframe by stainless steel tig welding. The side panels will contour around the rear wheels in such a manner to give a pleasing appearance.

Wheel well liners of 3/16" thick vacuum formed ABS composite will be incorporated into the side panels. They will be full depth and height and form a complete seal with the outside skirting. They will be mounted by use of 1/4" stainless steel bolts with lock washers drilled and tapped into stainless steel mounting brackets.

The rear end panel will be welded to the side panels and bolted to the rear subframe cross member using stainless steel 3/8" bolts.

FENDERETTES (STAINLESS STEEL)

Polished stainless steel fenderettes are to be installed around the wheel well openings using a black reinforced vinyl trim and 1/4" stainless steel bolts with lock washers drilled and tapped into the body.

LADDER FOR TANK

A ladder will be installed at the rear of the apparatus (streetside) from the rear platform to allow access to the top of the tank.

REAR MID-STEP

A step approximately 12" deep and full width of the tank will be fabricated and installed at the rear of the tank, above the rear dump system. Access to the step will be via a ladder from the rear tailboard platform.

REAR PLATFORM

A 24" rear platform will be furnished and will be integral to the body construction. It will be equipped with open grip grating. It will have beavertail supports on the ends, of not less than 2" angle and cross bracing of 2" channel. Mirror finish stainless trim protectors will be provided on the rearmost edge of each beavertail support.

HOSE BED

A hose bed shall be provided above the water tank. It shall be smooth and free of all projections which might interfere with hose loading and unloading. The walls of the hose bed will be 11" high. The hose bed floor will consist of black poly strips, spaced to allow ventilation.

The exterior of the hose bed shall be painted the same color as the body assembly with the inside walls left a natural finish.

HOSE BED DIVIDER

One (1) hose bed divider will be provided. The divider will be manufactured from 3/4" polypropylene. The rear end of the divider will be finished with a radius to provide a pleasing appearance and eliminate sharp edges.

HOSE BED COVER

A black vinyl hose bed cover with weighted rear flap shall be provided and installed. To prevent the cover being removed by wind, the leading edge will be folded over the front wall of the hose bed and held with 1/4 turn retainers. Quick release snaps will hold the sides in position.

COMPARTMENTATION

Two (2) compartments of 16 gauge stainless steel will be installed, one (1) on each side of the body, in front of the rear wheels. The approximate inside dimensions will be 27" deep X 37-1/2" high X 60" wide.

The compartments will be "sweep out" design and assembled by use of stainless steel welding. They will be fully welded on the seams to assure a nice fit and to keep the elements from entering.

Each compartment shall be properly vented.

COMPARTMENT SUPPORTS:

The compartments shall be supported on both ends and from underneath. Brackets from 2" X 2" stainless steel tubing will be fabricated and welded to the body framework. A 2" X 2" stainless steel tube crossmember will be welded between the brackets and bolted to the floor of the compartment. The front side will be fixed to the body frame by means of a tig welded bracket and the rear will be bolted to an extended frame crossmember.

COMPARTMENT DOORS

All compartment doors will be ROM brand roll-up style. The exterior of the doors shall remain a flat anodized aluminum finish.

Roll-ups to include a double wall aluminum box section slats with integral hinge joint and recessed slate seal, reusable endshoes with snap-in securement, double wall aluminum reinforced bottom rail with a stainless steel lift bar, aluminum track with side frame, sill plate, and top gutter with non-marring top seal, side seals, bottom seal, with all wear component material to be type 6 nylon.

The aluminum box section shall have a flat interior surface to prevent equipment hang-up. A face depth of 1.0 inches and a wall thickness of 0.045 inches. Each slat shall incorporate a recessed slat seal as to weatherproof the compartment and reduce rattle between the slats.

For every inch of height on an integral continuous hinge joint shall span the width of the door to provide superior strength.

The door shall glide on non-interlocked endshoes. Each endshoe shall be independent and positively secured by a snap-in device. Door slats shall be easily removed and replaced when required.

The stainless steel lift bar shall keep the door securely closed.

The ware components shall be constructed from type 6 nylon to provide maximum strength and durability. The type 6 nylon is a naturally lubricating material which provides exceptional temperature characteristics.

TOOL COMPARTMENTS

A compartment with approximate dimensions of 9" high X 10" wide X 102" deep will be provided under the catwalk, one (1) each side. The compartments will be integral to the body. Access to the compartments will be by brushed finish stainless steel doors at the rear and fastened with a raised trigger adjustable lever latch.

COMPARTMENT DECKING

Black "Turtle Tile" decking shall be installed in each compartment.

COMPARTMENT DECKING EDGE

The "Turtle Tile" decking shall have a 2" deep black tapered edge between the compartment door and the front edge of the decking. This will allow equipment to be easily removed and put back without catching the edge.

BODY COSMETICS

The area above the storage compartments and body skirting will be clad with polished stainless steel embossed tread plate. The outer edge will be broke twice. Once at a downward angle of 90 degrees in order to protect the outer compartment edges, and then broke out at approximately 45 degrees to serve as a drip rail for the compartments.

The front outer face of the compartments shall be clad with polished stainless steel embossed tread plate.

All tread plate used will be fastened with stainless steel screws and lock washers.

A 1/4" X 2" #4 finished polished stainless steel rub rail shall be installed along the bottom of the compartments and skirting on both sides. The rub rail shall have chamfered edges for increased appeal, style, and cleanability. The rub rail shall have tapered end caps at the front and rear of the apparatus body and at the wheel well openings. The rub rail shall be fastened with stainless steel bolts and held away from the body with rubber spacers. It shall be easily removable if replacement becomes necessary.

FOLDING STEPS

One (1) lighted heavy-duty, folding helper step shall be provided on the front face of the driver's side and passenger side compartments. The steps will be chrome-plated and have a minimum 42 square inch serrated stepping surface. The steps shall be fastened with stainless steel bolts with nylon lock nuts and reinforced with backing plates.

PORTA-TANK RACK

A 2100 gallon manually operated flip down style porta-tank rack will be provided and installed on top of the curbside skirting. It shall be constructed from 1-1/2" .065 wall stainless steel tubing with a polished #4 satin finish. It shall be held in the upright position by two (2) stainless steel over center toggle locking clamps with safety latch. The overall inside dimension shall measure 137 inches. A magnetic switch shall be mounted to the hinge that will activate the "HAZARD LIGHT" when it is not in the transport mode.

VINYL COVER

Two (2) 16 gauge stainless steel wind deflectors shall be fabricated and installed (one (1) front, one (1) rear) of the Porta-Tank rack. A black vinyl cover shall be installed on the outside of the wind deflectors. An aluminum reinforcing bar shall be installed through the top and bottom of the vinyl cover for added strength and durability. A NFPA non-slip safety grab handle will be provided at each end to facilitate handling.

HOSE BED HANDRAIL

One (1) NFPA non-slip horizontal handrail shall be installed below the hose bed. The handrail will be secured against rotation in matching chrome-plated stanchions with a third stanchion installed at the center for additional stability. All three (3) stanchions shall be mounted on molded rubber gaskets and fastened to the apparatus with stainless steel bolts and nylon lock nuts.

HARD HOSE TRAYS

Two (2) #4 finish polished stainless steel hard hose trays shall be fabricated and installed on top of the streetside skirting. Each tray will hold one (1) 6" x 10' length of hard suction hose. Velcro straps shall be utilized with stainless hardware to keep the hose in its tray when not in use.

PAINT PROCEDURE

All metal surfaces on the apparatus body shall be cleaned and prepared for painting. Every imperfection shall be removed or filled and then the entire surface(s) that are to be painted shall be etched and sanded smooth. All seams shall be sealed before painting.

To ensure proper adhesion of the coatings to the stainless steel it shall be chemically cleaned to remove all dirt, oil, grease and metal oxides.

A two (2) part epoxy primer/surfacer shall be applied to the cleaned metal surfaces to provide a strong corrosion resistant base coat and to smooth out the surface(s).

The primer coats shall be sanded to an extremely smooth finish before the sealer coat and paint are applied.

Before painting, the entire area that is to be painted shall be tacked off to remove any and all dust particles. Acrylic urethane paint is then applied in multiple coats until uniform color coverage is achieved, followed by two (2) coats of urethane clear.

After drying, the entire painted surface(s) shall be wet sanded to remove any imperfections in clear coat and machine buffed for a smooth and pleasing appearance.

All removable items such as compartment doors, hinges, trim, bracketry, etc., shall be removed and painted separately to insure complete paint coverage behind all mounted items.

: Roll-up doors are not to be painted and shall remain a natural aluminum finish, unless called out in the roll-up door section.

All trim pieces mounted to the apparatus shall be de-burred to eliminate any sharp cutting edges.

The insides of the compartments, rear end panel and the tank shall not be painted, but the exterior of the apparatus body (sides) shall be painted the same color as the chassis. The interior of the cabinets and the rear end panel will be a polished #4 satin finish.

EXTERIOR FINISH

The four exterior sides of the tank will be painted according to tank manufacturer's recommended procedure to match the body and cab. The top will be left as black polypropylene.

TOUCH-UP PAINT & ASSORTED FASTENERS

A two (2) ounce container with applicator brush of touch-up paint shall be supplied for each color of the finished apparatus body color. This touch-up paint shall be delivered with the apparatus at the time of delivery and include the paint make and number for future reference.

A bag of assorted stainless steel fasteners used in the construction of the apparatus shall be provided to the purchaser at the time of delivery and acceptance of the completed apparatus.

ANTI-CORROSION PROTECTION

The design of the apparatus body is such that the association of different metals is minimized. Where it is unavoidable an anti-corrosion coating is used between the two metals.

The anti-corrosion material is a dispersion of metallic zinc in a mobile vehicle designed to prevent corrosion caused by electrolysis between the two metals.

When stainless steel screws pass through aluminum they will be treated with the anti-corrosion coating to prevent the onset of electrolysis.

STAINLESS STEEL WHEEL SIMULATORS

Four (4) polished stainless steel wheel simulators shall be provided and installed over the chassis's existing wheels. They shall be equipped with polished lug nut covers and Lincoln caps.

TIRE PRESSURE INDICATORS

There shall be a visual tire pressure indicator at each tire's valve stem on the vehicle that shall indicate if there is insufficient pressure in the specific tire.

N.F.P.A. STRIPING

In accordance with the guidelines of NFPA Pamphlet #1901-2009 edition, a retroreflective stripe(s) shall be affixed to at least 50% of the cab and body length on each side (excluding pump panel areas), and at least 25% of the width of the front of the apparatus.

The stripe or combination of stripes shall be a minimum of 4" (100mm) in total width.

Reflective striping shall also be applied on the inside of the chassis cab doors.

N.F.P.A. STRIPING COLOR

The reflective stripe(s) shall be **WHITE** in color.

LETTERING

The apparatus shall be lettered with up to sixty (60) 3" high imitation gold style vinyl lettering with black outline and shadow. The lettering shall be of a style and script comparable to the department's existing apparatus.

CHEVRON STRIPING

Chevron striping shall be provided and installed at the rear of the apparatus, lower body panel only. Striping will be 6" wide red/fluorescent yellow green diamond grade reflective and installed in an inverted "V" pattern.

CHASSIS MODIFICATIONS

If chassis cab is equipped with an ignition key it shall be permanently attached to the chassis cab dash per N.F.P.A. codes.

All NFPA pamphlet #1901-2009 warning and information placards shall be provided and installed.

EXHAUST MODIFICATIONS (FACTORY)

The chassis exhaust system shall be left as it comes from the chassis manufacturer.

MUD FLAPS

Black rubber mud flaps, with Manufacturer's logo, shall be provided and installed behind the rear wheels.

MANUAL DISCONNECT AIR SHORE LINE

A manual disconnect air shore line shall be provided and installed near the driver's door. The air line shall be equipped with a one-way check valve. A mating female coupling will be provided and shipped loose.

FUEL TANK ENCLOSURE

The fuel tank and entrance steps will be clad with embossed stainless steel tread plate. This will be done in a manner which is both safe and practical. The tread plate should add to the appearance, not distract from it. All step areas shall be punched and formed raised surfaces for a positive skid resistant surface.

ENTRANCE STEPS ENCLOSURE

The entrance steps beneath the passenger door will be clad with embossed stainless steel tread plate. This will be done in a manner which is both safe and practical. The tread plate should add to the appearance, not distract from it. All step areas shall be punched and formed raised surfaces for a positive skid resistant surface.

TOW EYE

A 3/4" x 6" single painted rear tow eye will be installed at the rear of the unit, under the rear dump and attached directly to the chassis frame. It shall be surrounded by a rubber boot and trimmed with a 16 gauge stainless steel frame assembly.

ELECTRICAL SYSTEM

The apparatus shall be equipped with a Class 1 ES-KeyTM Management System for controlling electrical

system devices. This management system shall be capable of performing load management functions and be fully programmable.

The ES-Key TM system shall utilize a Controller Area Network to provide control signals for "real time" operation. The system will consist of appropriate module(s) sized and engineered to match the requirements of the apparatus.

All insulated wiring shall be high temperature GXL or GPT type, in conformance with SAE J 1128 and shall be protected by an oil and temperature loom where possible. Individual wires will be protected by color and numerically coded insulation. All wire end terminals, including locking bulkhead connectors, shall be mechanically fixed to the wire ends by terminal crimping tools.

The electrical system will incorporate a master disconnect switch which will be mounted separately from the switch panel (next to the driver's seat). A green battery indicator light will be provided in the chassis cab visible to the driver to indicate when it is in the "on" position. When "off" the batteries will remain connected to the starter but all the power will be off to the rest of the unit.

All electrical and electronic components shall be selected and installed to minimize electrical loads and comply with NFPA #1901 (2009 revision) standards along with testing procedures as described below:

The following tests shall be performed in this order. Before each test, the batteries shall be fully charged until the voltage stabilizes at the voltage regulator set point and the lowest charge current is maintained for 10 minutes.

TEST #1. RESERVE CAPACITY TEST:

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged.

The engine shall be shut off and the minimum continuous electrical load shall be activated for 10 minutes.

All electrical loads shall be turned off prior to attempting to restart the engine.

The battery system shall then be capable of restarting the engine.

Failure to restart the engine shall be considered a test failure.

TEST #2. ALTERNATOR PERFORMANCE TEST AT IDLE:

The minimum continuous electrical load shall be activated with the engine running at idle speed.

The engine temperature shall be stabilized at normal operating temperature.

The battery system shall be tested to detect the presence of a battery discharge current.

The detection of battery discharge current shall be considered a test failure.

TEST #3. ALTERNATOR PERFORMANCE TEST AT FULL LOAD:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed.

The test duration shall be a minimum of 2 hours.

Activation of the load management system shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the system, or a system voltage of less than 11.8 V dc for a 12 V nominal system or 23.6 V dc for a 24 V nominal system, for more than 120 seconds, shall be considered a test failure.

TEST #4. LOW VOLTAGE ALARM TEST:

Following completion of the above tests, the engine shall be shut off.

With the engine shut off, the total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates.

The battery voltage shall be measured at the battery terminals.

The test shall be considered a failure if the alarm has not yet sounded 140 seconds after voltage drops to 11.7 V for a 12 V nominal system or 23.4 V for a 24 V nominal system.

The battery system shall then be able to restart the engine.

Failure to restart the engine shall be considered a test failure.

At the time of delivery, documentation shall be provided with the following information:

- (1) Documentation of the electrical system performance tests.
- (2) A written load analysis, including the following:
 - (a) The nameplate rating of the alternator
 - (b) The alternator rating under the conditions specified in NFPA 13.3.2
 - (c) Each of the component loads specified in 13.3.3 that make up the minimum continuous electrical load
 - (d) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
 - (e) Each individual intermittent electrical load

VEHICLE DATA RECORDER

The apparatus shall be equipped with a Weldon, Vehicle Data Recorder (VDR) that collects essential data for department training needs.

PRODUCT FEATURES:

- Recorded Data Includes: Vehicle Speed, Acceleration, Deceleration, Engine Speed, Engine Throttle Position, ABS Event, Seat Occupied Status, Seat Belt Status, Master Optical Warning Switch, Park Brake, Service Brake, Time, Date and Engine Hours.
- Password Protected by the customer
- Six (6) seat position inputs for occupied and belts buckled. Additional six (6) seat expansion module available (p/n 6020-0000-00)
- Easily interfaces with traditional wiring, V-MUX™ or other multiplexing systems
- Data is extracted by a standard, mini USB cable
- Use in conjunction with the Occupant Restraint Indicator or V-MUX™ multiplex system

SEAT BELT WARNING SYSTEM

The apparatus shall be equipped with a Weldon, Occupant Restraint Indicator system to alert driver and officer where restraints of occupied seats are properly fastened keeping personnel safe.

PRODUCT FEATURES:

- Low profile, compact size
- Supports commercial and custom cab seating layouts; up to 12 seats
- Dimming feature adjusts indicator intensity to synchronize with dash lights
- Built-in audible alarm
- Standard 4 year warranty
- Use in conjunction with Vehicle Data Recorder (VDR)

CAB CONSOLE

One (1) electrical console shall be fabricated and installed between the two (2) front seats. It shall be fabricated from 1/8" aluminum with removable panel(s) for service. The top of the console shall be clad with a non-glare black vinyl covering.

ELECTRICAL SYSTEM SCHEMATICS

Two (2) complete electrical system schematics diagramming each individual circuit shall be provided upon delivery of the apparatus.

ROCKER SWITCH PANEL

A rocker type switch panel with a "Master switch" and individual switches will be installed to provide the ability to de-activate individual lighting units, should the driver/officer require it. This panel will be lettered and lighted and conveniently mounted in the cab.

EMI/RFI PROTECTION

Apparatus design and construction shall incorporate the latest designs in incorporating Electromagnetic Interference Suppression, which is required to satisfy the radiation limits specified in SAE (Standard for Automotive Excellence) J551, "Performance Levels and Methods of Measurement of Electromagnetic Radiation from vehicles and devices (30-1000 MHz), and of which has been adopted by NFPA 1901. System design and components used shall insure that radiated and conducted electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source.

The apparatus proposed shall have the ability to operate in the electromagnetic environment typically found in fire ground operations.

EMI/RFI susceptibility shall be controlled by applying immune circuit designs, shielding, twisted pair wiring, and filtering. The electrical system shall be designed for full compatibility with low level control signals and high powered two (2) way radio communication systems. Harness and cable routing shall be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

In order to fully prevent radio frequency interference (RFI), the purchaser shall provide a listing of the type, power output, and frequencies of all radio and bio medical equipment that is proposed to be used on the apparatus.

WARNING SYSTEMS

Clearance/Marker/Identification lights and reflectors will be installed according to DOT regulations.

At the rear of the apparatus three (3) mini red LED lights will be installed on the rear as high as practicable with one on the center line and lights spaced 6"-12" apart. Two (2) additional mini red LED lights will be installed as far apart as possible to show the overall width of the apparatus and as high as practicable.

Red combination LED reflector/marker lights will be surface mounted in the lower rear side body section.

Red reflectors will be installed on the rear tailboard as far apart as possible. The front (amber) reflectors will be incorporated in the turn signals and midpoint amber reflectors will be installed on each side of the body.

STOP/TURN/BACK-UP LIGHTS

Stop-Tail Light(s):

Two (2) Whelen #600 series, red LED stop-tail lights shall be mounted, one (1) each side at the rear of the apparatus.

Directional Light(s):

Two (2) Whelen #600 series, amber LED directional lights shall be mounted, one (1) each side at the rear of the apparatus.

Back-Up Light(s):

Two (2) Whelen #600 series, clear LED back-up lights shall be mounted, one (1) each side at the rear of the apparatus and wired to the reverse gear.

The above lights shall be housed in Whelen #PLAST4V, chrome plated housings.

BACK-UP ALARM

One (1) back-up alarm shall be installed and wired to the reverse gear. It shall meet the Type D (87 db) minimum requirements of SAE J994 and NFPA 1901.

HAZARD LIGHT

A red flashing LED light, located in the driving compartment, shall be illuminated automatically whenever the apparatus's parking brake is not fully engaged and any of the following conditions exist:

- (1) Any passenger or equipment compartment door is open.
- (2) Any ladder or equipment rack is not in the stowed position.
- (3) Powered light tower is extended (if applicable).
- (4) Any other device is opened, extended, or deployed that creates a hazard or is likely to cause damage to the apparatus if the apparatus is moved.

The light shall be marked "**DO NOT MOVE APPARATUS WHEN LIGHT IS ON**".

LICENSE PLATE HOLDER

A Cast Products #LP0005-1-A, surface mount LED lighted license plate holder shall be provided at the rear of the apparatus. The holder shall be of cast aluminum construction with bright finish edges.

ELECTRONIC SIREN

A Whelen #295SLSA1, electronic siren shall be provided and located in a location convenient to the driver and officer. The siren shall include Radio Rebroadcast, Public Address, Manual, Wail, Yelp, Air horn and Piercer Tones. A pre-wired noise cancelling microphone shall be supplied on the siren head.

SPEAKER

One (1) Whelen #SA315P, 100 watt speaker shall be provided and installed at the front of the apparatus, in the front bumper assembly.

REAR SCENE LIGHTS

Two (2) Whelen #90E000ZB, 8-32 degree opti-scene lights will be mounted one (1) each side, at the rear of the apparatus. They will be wired to the reverse gear and be used with the back-up lights. There will be an override switch located on the rocker switch panel in the cab to activate the rear scene lights when the unit is not in the reverse gear.

SIDE SCENE LIGHTS (FRONT)

Two (2) Whelen #90E000ZB, 8-32 degree opti-scene lights mounted one (1) at each front upper corner of the apparatus will be provided and controlled from the master console in the cab. These lights will be mounted on light pedestals and will be fully enclosed so as not to expose wiring.

SIDE SCENE LIGHTS (REAR)

Two (2) Whelen #90E000ZB, 8-32 degree opti-scene lights mounted one (1) at each rear upper corner of the apparatus will be provided and controlled from the master console in the cab. These lights will be mounted on light pedestals and will be fully enclosed so as not to expose wiring.

GROUND/STEP LIGHTS

Four (4) clear LED underbody lights shall be supplied to provide illumination on the ground in areas designed for personnel to climb onto the apparatus. The lights will be controlled automatically by use of the chassis parking brake.

The lights shall be positioned as follows:

- : Two (2) lights will be installed under the front side compartments, one (1) each side.
- : Two (2) lights will be installed under the rear tailboard assembly, one (1) each side.

All of these lights shall be mounted so as to be fully enclosed and not to expose any wiring.

REAR PLATFORM WORK LIGHTS

Two (2) 4" clear LED lights will be mounted in the rear beaver tail assembly pointing towards the center over the rear tailboard area as "work lights". The lights will be activated when the parking brake is set.

CAB ENTRY/EXIT LIGHTING

One (1) clear LED light shall be mounted beneath each door step. These lights shall be mounted on an approximate 30 degree angle to provide illumination on areas under the driver and crew riding area exits. All cab entry/exit lights will automatically activate when any of the chassis doors are opened.

COMPARTMENT LIGHTING

The side body compartments will have LED strip (rope) lighting installed down one side and across the top of each compartment. The lights shall activate automatically when a compartment door is opened.

ENGINE COMPARTMENT LIGHT

One (1) switched light shall be provided and installed inside the engine compartment. This is to provide lighting for vehicle maintenance.

AIR HORNS - CHASSIS SUPPLIED

The air horns shall be supplied and mounted by the chassis manufacturer in a location as indicated in the chassis specifications.

BATTERY CHARGER (PRO POWER)

A Pro Power fully automatic solid state battery charger equipped with a remote LED display repeating the charger readout shall be installed to maintain the apparatus's batteries while the truck is not in use.

A Kussmaul 091-55-20-120, super auto eject receptacle shall be included to release the plug automatically upon energizing of the starter solenoid. The receptacle shall be protected by a weatherproof spring loaded cover plate located near the driver's door.

WATER LEVEL GAUGE - CLASS 1 (REAR)

A Class 1 "Intelli-Tank" level system for water shall be provided and installed at the rear of the tank (above the quick dump). The display features wide angle viewing and ultra bright LED's for high visibility even in direct sunlight. The system uses a pressure transducer which shall be mounted into the wall of the tank.

WATER LEVEL GAUGE - CLASS 1 (PUMP PANEL)

An additional Class 1 "Intelli-Tank" display shall monitor the water tank level and shall be mounted on the driver's side pump operator's panel.

NFPA CERTIFIED LIGHTING REQUIREMENTS

The optical warning system on the fire apparatus shall be capable of two (2) separate signaling modes during emergency operations. The first mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is **CALLING** for the "Right-Of-Way". The second mode shall signal that the apparatus is stopped and is **BLOCKING** the "Right-Of-Way".

The switching between modes shall be provided by a sensor that senses the position of a parking brake or the park position of an automatic transmission. When the master optical warning system switch is closed, and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for Right-Of-Way shall be energized. When the master optical warning system is closed, and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the Right-Of-Way shall be energized. The system shall be permitted to have a method of modifying the two signaling modes.

WHELEN - NFPA CERTIFIED LED LIGHTING PACKAGE

ZONE A UPPER

One (1) Whelen #JE2NFPA, 56" NFPA Justice series LED light bar is to be mounted on the cab roof. As required by N.F.P.A. Pamphlet #1901, the clear sections will automatically turn off when the blocking right-of-way mode.

ZONE A LOWER

Two (2) Whelen #LINZ6R, LINZ6 series, red Super-LED warning lights with chrome flanges shall be mounted in the chassis grill, one (1) each side. They shall be installed with stainless steel backing plates.

ZONE B LOWER

Two (2) Whelen #LINZ6R, LINZ6 series, red Super-LED warning lights with chrome flanges shall be affixed, one (1) between the front wheel and the front of the vehicle and one (1) to the side body panels, behind the rear wheels.

ZONE C UPPER

Two (2) Whelen #L31HRFN, L360 series, red Super-LED beacon warning lights shall be provided on light pedestals, one (1) each side, at the upper rear sides of the apparatus. The light pedestals will be fully enclosed so as not to expose wiring.

ZONE C LOWER

Two (2) Whelen #60R02FRR, 600 series, red Super-LED warning lights shall be affixed, one (1) each side, to the rear of the apparatus.

ZONE D LOWER

Two (2) Whelen #LINZ6R, LINZ6 series, red Super-LED warning lights with chrome flanges shall be affixed, one (1) between the front wheel and the front of the vehicle and one (1) to the side body panels, behind the rear wheels.

HALE MBP P.T.O. PUMP

PUMP ASSEMBLY:

The pump shall be of a size and design to mount on the chassis rails of commercial or custom truck chassis, and have the capacity of 750 gallon per minute (U.S. GPM), NFPA-1901 rated performance.

The entire pump shall be assembled and tested at the pump manufacturer's factory.

The pump shall be driven by the truck transmission mounted PTO. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance within the torque rating of the PTO, truck transmission and drive line components.

The entire pump shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA Pamphlet No. 1901. Pump shall be free from objectionable pulsation and vibration.

The pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI (2069 bar). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron is not acceptable.

Pump body shall be vertically split, on a single plane for easy removal of entire impeller assembly, including clearance rings.

Pump shaft to be rigidly supported by two bearings for minimum deflection. The bearings shall be heavy-duty, deep groove ball bearing in the gearbox and they shall be splash lubricated.

Pump impeller shall be hard, fine grain bronze of mixed flow design; accurately machined, hand-ground and individually balanced. The vanes of the impeller intake eyes shall be hand-ground and polished to a sharp edge, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

Impeller clearance rings shall be bronze, easily renewable without replacing impellers or pump volute body.

The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

GEARBOX:

The gearbox shall be manufactured and tested at the pump manufacturer's factory.

Pump gearbox shall be of sufficient size to withstand the torque of the engine in pump operating conditions. The gearbox shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature.

The gearbox drive shaft shall be of heat-treated chromium nickel steel and shall withstand the full torque of the engine in both road and pump operating conditions.

All gears, both drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and teeth integrated and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut helical design shall be provided.

The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

MANUALS:

Two (2) shop manuals covering the pump, pump transmission and necessary working parts of the pump shall be provided with the apparatus.

PRIMING PUMP HALE ESP

The priming pump will be a Hale model ESP Oil-Less priming system. The ESP priming system provides the ultimate in fast priming, high vacuum performance and reliability without the use of a lubricant. Technologically advanced and environmentally safe, the Model ESP is self lubricating. There is no oil tank to check, no oil is expelled to the ground. The model ESP is a semi-automatic priming system with a single action control valve which simultaneously activates the entire system, ensuring fast, consistent air evacuation. Hale's electric rotary vane - type positive displacement primer operates with 12-volt or 24 volt DC power.

The model ESP features a totally enclosed motor to prevent dust, dirt, and water from entering. All system components, motor/pump unit and control valve are supplied ready for assembly.

SPECIFICATIONS:

- : PERFORMANCE: Vacuum capability of 24 in. (Hg 610 mm Hg).
- : PUMP TYPE: Heat treated, anodized aluminum specially coated for wear and corrosion resistance.
- : MOTOR: Direct current, totally enclosed; 4.5 in. (114 mm) diameter.
- : CONTROL VALVE: Single action, push-pull control valve, all bronze construction. Designed for mounting on pump or panel for remote control operation.

PTO

One (1) Chelsea or equivalent Power Take-Off unit shall be supplied to connect and power the pump from the transmission.

ELECTRIC PUMP SHIFT

The pump shift shall be controlled by a switch located on the chassis cab dash.

AUXILIARY SUCTION INLET (STREETSIDE)

One (1) auxiliary 2-1/2" NST gated inlet shall be provided at the streetside pump panel. The valve shall be an Akron 2-1/2", 1/4 turn ball type with control at the valve location. The valve shall be located behind the pump panel.

The auxiliary inlet shall be equipped with a chrome swivel, removable cleanable strainer, male plug and retaining chain. An individual drain shall be furnished. The drain shall be piped toward the ground.

SUCTION INLET

A 6" non-gated suction inlet will be located on the streetside of the apparatus. The inlet will have a long handled chrome plated cap and removable strainer.

STREETSIDE DISCHARGES

Two (2) 2-1/2" discharges will be installed on the streetside of the apparatus. The discharge valves shall be Akron 2-1/2", 1/4 turn, full-flow, drop-out, self-locking type and controlled from the pump operator's panel. The 2-1/2" discharge valves shall be gated with easy operating controls. The 2-1/2" outlets shall be equipped with chrome plated 2-1/2" NSTM, 30 degree droop snoot ends with chrome caps with chains.

CURBSIDE DISCHARGE

One (1) 2-1/2" discharge will be installed on the curbside of the apparatus. The discharge valve shall be an Akron 2-1/2", 1/4 turn, full-flow, drop-out, self-locking type and controlled from the pump operator's panel. The 2-1/2" discharge valve shall be gated with easy operating controls. The 2-1/2" outlet shall be equipped with chrome plated 2-1/2" NSTM, 30 degree droop snoot end with chrome cap and chain.

DRAIN VALVES

A Class 1, 1/4 turn and/or automatic drain valve shall be installed for all 1-1/2" or larger discharges. Cable actuated drains are not acceptable.

MASTER DRAIN

A master drain of rotary type, bronze construction to be provided on the pump. Control for this valve to be located so operator does not have to crawl under the apparatus to operate. Master pump drain control is to be operated from the left side of the apparatus. All pump passages, including relief valve, shall be connected to the master drain. Cable actuated drains are not acceptable.

TANK TO PUMP

One (1) tank to pump line shall be provided and equipped with an Akron 3", 1/4 turn, full flow, ball valve with 4" plumbing from the tank to the valve. The valve shall be controlled from the pump operator's panel.

A check valve shall be provided in the tank to pump line that prevents unintentional back-filling of the water tank through the line (NFPA #1901).

TANK REFILL

One (1) Akron 2", 1/4 turn, pump to tank valve located on the discharge side of the pump piping to the tank shall be provided. The control handle for the pump to tank valve shall be located on the pump operator's panel.

The valve and pump shall be connected to the tank by use of stainless steel fittings and flexible hose to eliminate stress on the lines.

PUMP PIPING

All piping for the pump assembly will be heavy duty stainless steel or Class 1 reinforced rubber hose.

In order to minimize friction loss only sweep type elbows will be used. Where vibration or chassis flexing may cause damage or loosen piping, victaulic or rubber couplings will be utilized to eliminate this possibility.

Wherever threaded joints are used the sealing compound will be of the non-hardening type to insure ease of removal for repair or replacement of couplings.

All lines will drain through either the master drain valve or will be equipped with individual drain valves. One (1) individual drain valve will be installed for each gated suction or discharge 2-1/2" or larger in size.

The entire pump assembly, including all valves, piping and suction lines will be subjected to a hydrostatic test consisting of both a pressure and a vacuum test. The vacuum test consists of developing a vacuum of 22 in. HG (74.5 kPa) and holding for 5 minutes without losing more than 10 in. of vacuum.

VALVES FOR PUMP OPERATION

All 1" or larger in-line valves will be Akron Brass 8000 series full flow style with stainless steel balls. All in line valves will be controlled by easy operating controls. Controls will be designed and installed to permit easy operation of the valves without distortion along with the ability to be re-adjusted if need be.

All 3" or larger discharge valves will be equipped with a slo-cloz option which hydraulically decelerates the opening and closing of the valve to comply with NFPA Pamphlet #1901 recommendations.

Valves shall have a ten (10) year warranty.

SUCTION PRESSURE RELIEF VALVE

An Elkhart suction pressure relief valve, preset at 125 PSI, will be installed on the suction side of the

pump. The adjustable pressure relief valve will be of cast brass construction and include a stainless steel spring and rubber seat. If the outlet discharges it shall discharge in a manner that will not expose personnel to high pressure water streams. The discharge outlet will be constructed of 2-1/2" piping and be equipped with a 2-1/2" NPTF x 2-1/2" NSTM adapter. The outlet will be labeled "**INTAKE PRESSURE RELIEF OUTLET - DO NOT CAP**".

HEAT EXCHANGER

A supplementary heat exchanger of bronze construction, with tubing and "Open-Closed" control valve on operator's panel is to be provided. Design shall be to allow for use of water from discharge side of the pump for cooling of coolant circulating through the engine cooling system without intermixing. The heat exchanger shall be connected to the drain valve to prevent damage caused by freezing.

PUMP ENCLOSURE "INSIDE COMPARTMENT"

The apparatus shall have a pump panel located in the streetside compartment. The pump panel shall be constructed from .125" (1/8") aluminum and clad with a non glare black vinyl covering.

The pump panel shall be illuminated by the compartment lighting activated by the compartment roll-up door

PUMP OPERATOR'S PANEL

All pressure and compound gauges to be fluid filled. Gauges shall be equipped with white face and black lettering.

The following items shall be furnished on the pump operator's panel:

One (1) 4-1/2" master pressure gauge, 0-400 PSI, fluid filled.

One (1) 4-1/2" master vacuum gauge, -30-0-400 PSI, fluid filled.

One (1) 2-1/2" individual pressure gauge for each 1-1/2" discharge or larger and/or preconnect, 0-400 PSI, fluid filled.

One (1) water level readout indicator.

One (1) Class 1, TPG Total Pressure Governor.

- Engine RPM Display
- System Voltage Display and Alarm
- Engine Oil Pressure Display and Alarm
- Engine Water Temperature Display and Alarm
- Throttle Ready Indicator Light

One (1) set of UL test ports for pressure and vacuum.

One (1) auxiliary engine cooler valve control (heat exchanger).

One (1) primer control.

All discharge and/or preconnect controls.

One (1) tank fill / pump bypass valve control.

One (1) tank to pump valve control.

One (1) auxiliary suction control.

One (1) WARNING: DEATH OR SERIOUS INJURY MAY OCCUR if proper operating procedures are not followed label.

One (1) pump performance plate.

A highly polished trim plate shall be provided around each discharge port and suction inlet opening to allow accessibility to valves for service and repairs.

PUMP PRESSURE ENGINE GOVERNOR - "TPG"

A Class 1, "TPG" Total Pressure Governor will be provided and installed on the pump operator's panel. It is designed to control the engine fuel to maintain a desired pump pressure, or engine speed setting.

Additionally the TPG will display important engine information specifically battery voltage, engine coolant temperature, oil pressure and RPM.

Features:

- * A panel control module (display), a pressure transducer and appropriate cables and connectors.

- * Large easy to read Alphanumeric display.

- * Sealed electronics which provide maximum resistance to water, condensation, and humidity.

- * A panel display which consolidates throttle with preselect and high idle features in a single 4-1/2" weather resistant housing.

- * Communicates with the engine ECU over the J1939 CAN bus for improved accuracy resolution and response.

When in the "pressure" mode the TPG will operate as a pressure sensor (regulating) governor (PSG) eliminating any need for a relief valve on the discharge side of the pump. This feature will be set to operate at 100 psi unless specifically requested by the customer to use another pressure. This setting can be changed by the department at a later date, if desired.

COLOR CODED IDENTIFICATION PLATES

Each control valve, gauge and discharge outlet shall be labeled with a color coded identification plate. For standardization, color coding shall be in accordance with the recommendations of NFPA Pamphlet #1901.

PUMP SAFETY FEATURES

When the apparatus is equipped with an automatic transmission, an interlock board shall be provided to ensure that the pump drive system components are properly engaged in the pumping mode of operation, so that the pumping system can be safely operated from the pump operator's position.

Any control device used in the pumping system power train between the engine and the pump shall be equipped with a means to prevent unintentional movement of the control device from its set position.

A plate indicating the chassis transmission shift selector position to be used for pumping shall be provided in the driving compartment and located so it can be easily read from the driver's position.

Where an automatic transmission is provided and where the pump is driven by a transmission mounted SAE PTO and is used for stationary pumping with the chassis transmission in neutral, or is used for pump and roll with the chassis transmission in any forward or reverse gear:

A:) Two (2) green indicator lights shall be located in the driving compartment. One (1) indicator light shall be energized when the pump drive has been engaged and shall be labeled "**PUMP ENGAGED**". The second light shall be energized when both the pump drive has been engaged and the chassis transmission is in neutral and shall be labeled "**OK TO PUMP**".

B:) One (1) green and one (1) red indicator light on the pump operator's panel shall be provided. The green light shall be energized when both the pump drive has been engaged and the chassis transmission is in neutral. The green light on the pump operator's panel shall be positioned adjacent to and preferably above the throttle control and shall be labeled "**THROTTLE READY**".

PUMP CERTIFICATION TEST - U.L.

One (1) certification test shall be performed at the manufacturers on site testing facility by **Underwriters Laboratories**.

The certification shall include at minimum:

- A) Pumping Test - NFPA 16.13.2
- B) Pumping Engine Overload Test – NFPA 16.13.3
- C) Pressure Control System Test - NFPA 16.13.4
- D) Priming System Tests - NFPA 16.13.5
- E) Vacuum Test - NFPA 16.13.6
- F) Water Tank-To-Pump Flow Test - NFPA 16.13.7
- G) If Fire Pump is Driven by the Chassis Engine: Engine Speed Advancement Interlock Test – NFPA 16.13.8
- H) Gauge and Flowmeter Test – NFPA 16.13.9

A test plate shall be provided at the pump operator's position that gives the rated discharges and pressures together with the speed of the engine as determined by the certification test. The plate shall be completely engraved with all information at the factory and attached to the vehicle prior to delivery. The original U.L. Certificate shall be provided upon acceptance and payment of the apparatus in full.

N.F.P.A. TAG REQUIREMENTS

A permanent plate in the driving compartment specifying the quantity and type of the following fluids (when applicable) used in the vehicle:

- (1) Engine oil
- (2) Engine coolant
- (3) Chassis transmission fluid
- (4) Pump transmission lubrication fluid
- (5) Pump priming system fluid, if applicable
- (6) Drive axle(s) lubrication fluid
- (7) Air conditioning refrigerant
- (8) Air conditioning lubrication oil
- (9) Power steering fluid

- (10) Cab tilt mechanism fluid
- (11) Transfer case fluid
- (12) Equipment rack fluid
- (13) CAFS air compressor system lubricant
- (14) Generator system lubricant
- (15) Front tire cold pressure
- (16) Rear tire cold pressure
- (17) Maximum tire speed ratings

An accident prevention sign that states "**OVERALL HEIGHT ____**" **AND LENGTH OF APPARATUS ____**" shall be provided and located in the chassis cab area that is visible to the driver.

An accident prevention sign that states "**GVWR**" shall be provided and located in the chassis cab area that is visible to the driver.

An accident prevention sign that states "**MAXIMUM SEATING CAPACITY "___**" shall be provided and located in the chassis cab in an area that is visible to the driver.

An accident prevention sign that states "**OCCUPANTS MUST BE SEATED AND BELTED WHEN APPARATUS IS IN MOTION**" shall be provided and located in the chassis cab in an area that is visible to each seated position.

An accident prevention sign that states "**DO NOT WEAR HELMET WHILE SEATED**" shall be provided and located in the chassis cab in an area that is visible from each seated position.

One "Final Stage Label" shall be attached to the driver's side door jam. The label shall certify that the complete vehicle conforms to the federal motor vehicle safety standards, which have been previously fully certified by the incomplete vehicle manufacture or by the intermediate vehicle manufacture and have not been affected by the final stage manufacture.

A warning label that states "**WARNING: DEATH OR SERIOUS INJURY MAY OCCUR if proper operating procedures are not followed. The pump operator and all individuals connecting supply or discharge hoses must be familiar with operator manual, water hydraulics hazards, and component limitations.**" shall be provided and located on the pump operator's panel.

Two (2) accident prevention signs that states "**DANGER: DO NOT RIDE ON REAR STEP WHILE VEHICLE IS IN MOTION DEATH OR SERIOUS INJURY MAY RESULT**" shall be provided and installed one (1) each side at the rear of the apparatus.

NFPA 1901-2009 COMPLIANCE TESTS

VEHICLE STABILITY:

When the fire apparatus is loaded to its estimated in-service weight, the height of the vehicle's center of gravity (CG) shall not exceed 80 percent of the rear axle track width or the vehicle will be equipped with electronic stability control (ESC).

WEIGHT DISTRIBUTION:

When the fire apparatus is loaded to its estimated in-service weight, the front-to-rear weight distribution of the apparatus as defined in Section 12.1 shall be within the limits set by the chassis manufacturer.

The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer under full load and all other loading conditions.

LOAD DISTRIBUTION:

Using the information supplied by the purchaser, the apparatus manufacturer shall calculate the load distribution for the apparatus.

The manufacturer shall engineer the fire apparatus to comply with the gross axle weight ratings (GAWR), the overall gross vehicle weight rating (GVWR), and the chassis manufacturer's load balance guidelines.

The fire apparatus, as supplied by the manufacturer, shall have a side-to-side tire load variation of no more than 7 percent of the total tire load for that axle or the limits allowed by the axle or component manufacturer.

Each tire shall be equipped with a visual indicator or monitoring system that indicates tire pressure.

APPARATUS PERFORMANCE:

The apparatus shall meet the requirements of this standard at elevations of 2000 ft (600 m) above sea level.

The apparatus shall meet all the requirements of this standard while stationary on a grade of 6 percent in any direction.

The apparatus shall meet requirements of this standard in ambient temperature conditions between 32 degrees F (0 degrees C) and 110 degrees F (43 degrees C).

ROADABILITY:

The apparatus, when fully equipped and loaded as defined in Section 12.1, shall be capable of the following performance while on dry, paved roads in good condition:

- (1) From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 km/hr) within 25 seconds on a level road.
- (2) The apparatus shall be able to attain a minimum top speed of 50 mph (80 km/hr) on a level road.
- (3) The apparatus shall be able to maintain a speed of at least 20 mph (30 km/hr) on any grade up to and including 6 percent.

If the combined water tank and foam agent tank capacities exceed 1250 gallons the maximum top speed of the apparatus shall not exceed 60 mph.

SERVICEABILITY:

The apparatus shall be designed so that all the manufacturer's recommended routine maintenance checks of lubricant and fluid levels can be performed by the operator without lifting the cab of a tilt-cab apparatus or without the need for hand tools.

Where special tools are required for routine service on any component of the apparatus, such tools shall be provided with the apparatus.

Apparatus components that interfere with repair or removal of other major components shall be attached with fasteners, such as cap screws and nuts, so that the components can be removed and installed with

ordinary hand tools. These components shall not be welded or otherwise permanently secured into place.

ROAD TESTS:

Road tests shall be conducted in accordance with Section 4.17 to verify that the completed apparatus is capable of compliance with Section 4.15.

The tests shall be conducted at a location and in a manner that does not violate local, state or provincial, or federal traffic laws.

The tests shall be conducted on dry, level, paved roads that are in good condition.

The apparatus shall be fully equipped and loaded as required in Section 12.1.

The engine shall not be operated in excess of the maximum governed speed.

Acceleration tests shall consist of two runs in opposite directions over the same route.

The fire apparatus shall attain a speed of 35 mph (55 km/hr) from a standing start within 25 seconds.

The fire apparatus shall attain a minimum top speed of 50 mph (80 km/hr).

If the apparatus is equipped with an auxiliary braking system, the manufacturer shall road test the system to confirm that the system is functioning as intended by the auxiliary braking system manufacturer.

If the apparatus is equipped with an air brake system, the service brakes shall bring the apparatus, when loaded to its maximum in service weight, to a complete stop from an initial speed of 20 mph (32.2 km/hr), in a distance not exceeding 35 ft (10.7 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil, or grease.

ADDITIONAL EQUIPMENT - TO BE SUPPLIED

WHEEL CHOCKS (COLLAPSIBLE)

One (1) pair of Zico #SAC-44 collapsible wheel chocks shall be supplied and installed in front of the streetside wheels (under the compartment assembly) complete with mounting brackets.

FOL-DA-TANK

One (1) 2100 gallon, 22 oz., red hypalon, Fol-Da-Tank shall be supplied with the delivery of the apparatus. It shall come equipped with aluminum framing and inside lifting handles.